Review of testing concepts from previous S/W eng. courses

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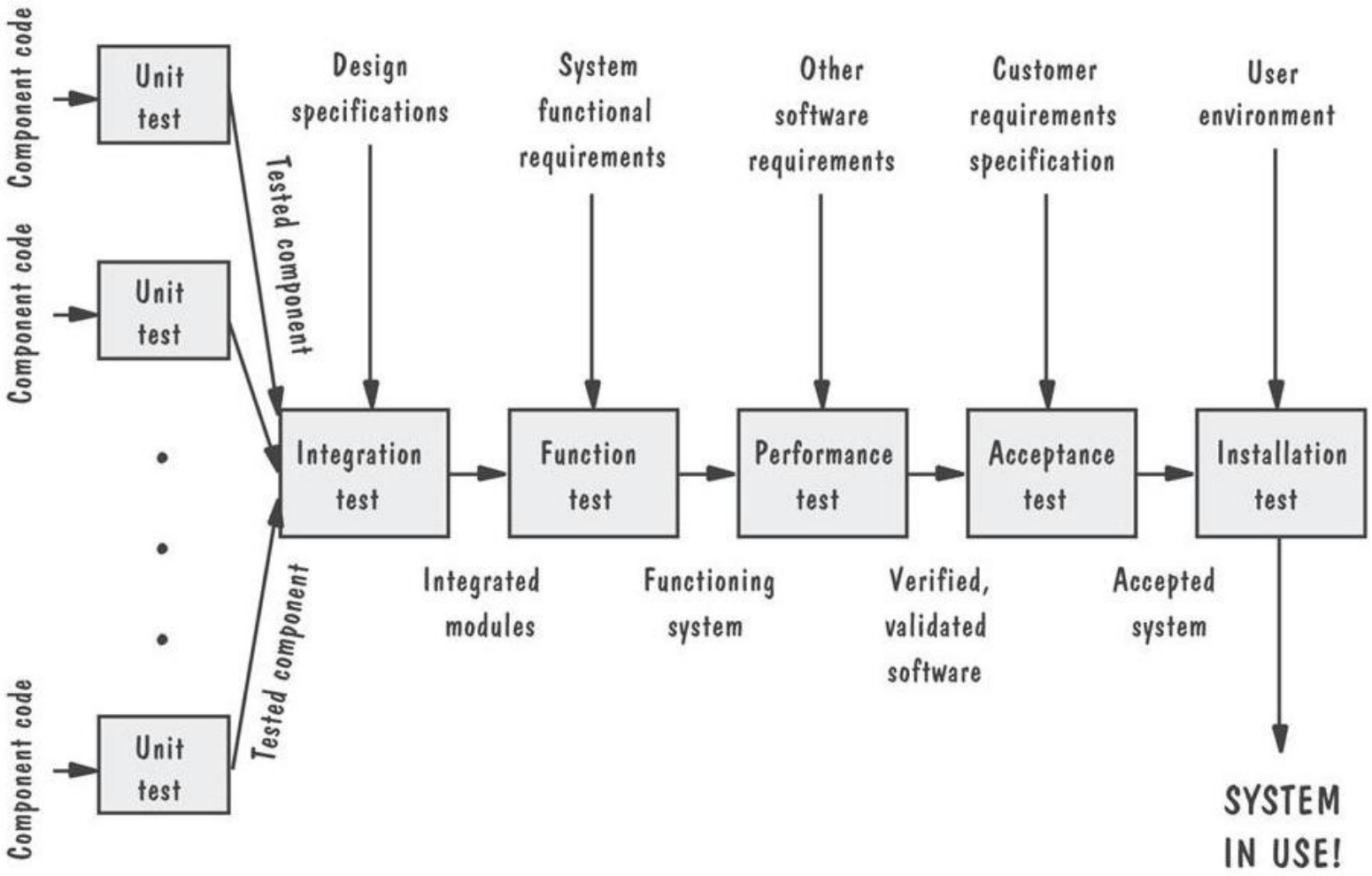
8.2 Testing Issues

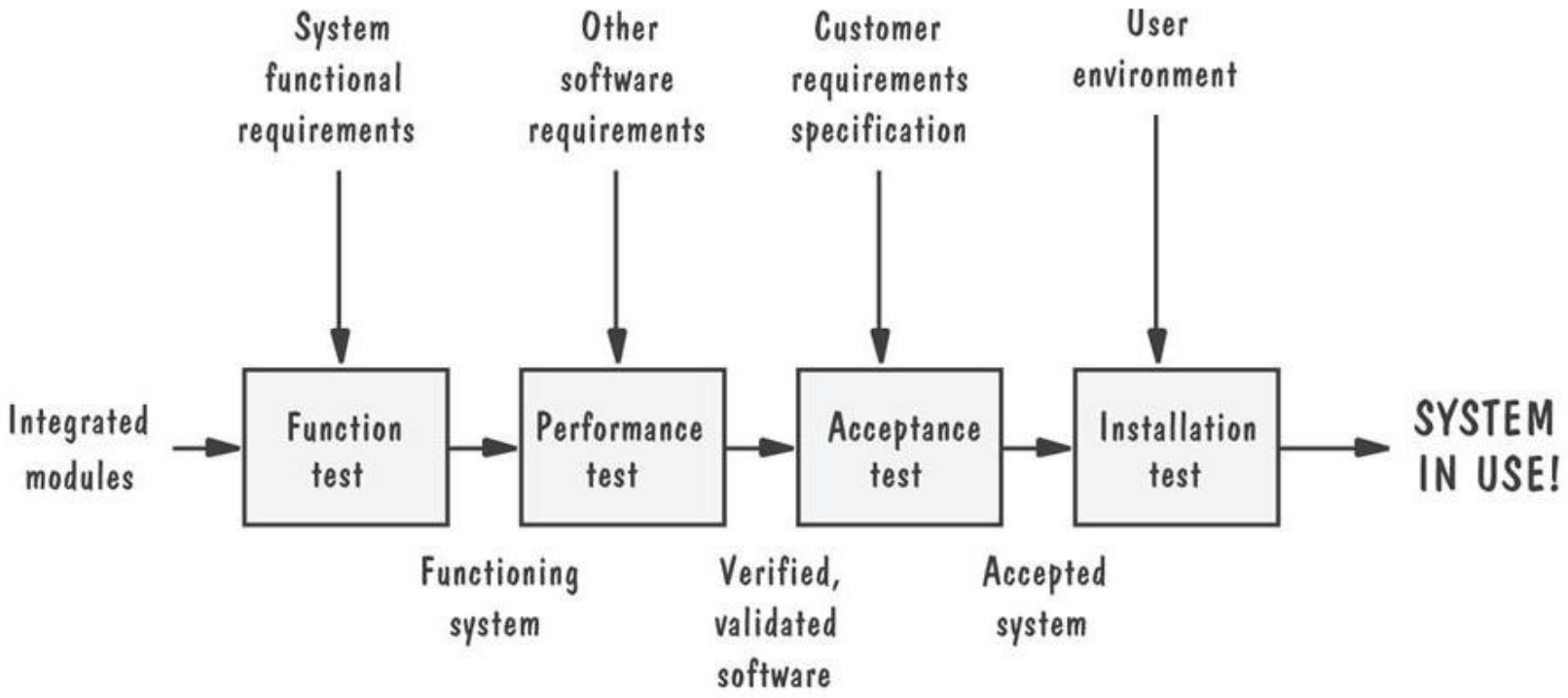
Testing Organization Illustrated



9.1 Principles of System Testing

System Testing Process (continued)

- Pictorial representation of steps in testing



8.2 Testing Issues
Who Performs the Test?

- It’s hard to remove personal feelings from testing process
- Independent test team
  - avoid conflict (between personal responsibility and need to discover plenty of faults)
  - developers may have interpreted requirements improperly or caused faults in the documentation
  - improve objectivity
  - The team can be a part of requirements and design review
  - testing and coding concurrently (as developers work on code)

8.2 Testing Issues

Views of the Test Objects

Our view of the test object can affect the testing process

- Closed box or black box: functionality of the test objects (contents are unknown)
  - Free of constraints
  - Check if every kind of input is tried (to produce desired output)
  - Not always possible to run a complete test

8.2 Testing Issues
Black or Closed Box

structure of the test objects

- Advantage
  - free of internal structure’s constraints
- Disadvantage
  - not possible to run a complete test

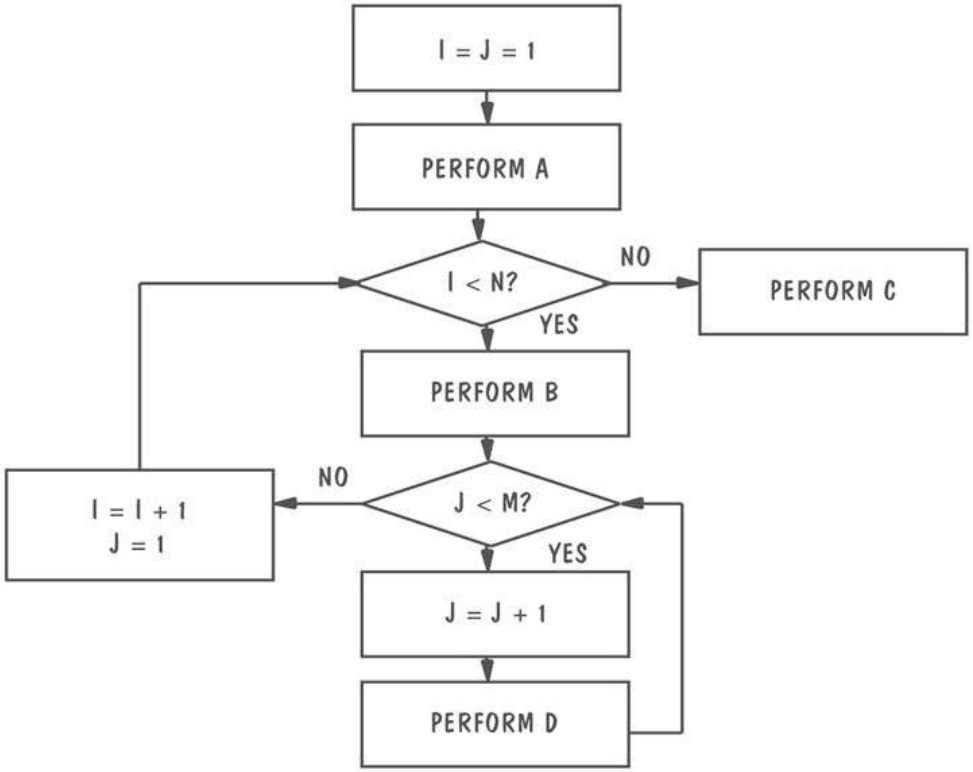
8.2 Testing Issues

White or Clear Box

- Clear box or white box: structure of the test objects
- Could device tests for control paths within components
- Testing can become complex

8.2 Testing Issues
Clear Box

- Example of logic structure



8.1 Software Faults and Failures

Types of Faults

- Algorithmic fault
  - Algorithm or logic does not produce proper output for a given input
  - Sometimes found by just ‘desk checking’ or submitting input
- Syntax fault (language specific)
  - First US mission to Venus failed because of a missing comma
- Computation and precision fault
  - A formula’s implementation is wrong or wrong number of decimal places in the results.

8.1 Software Faults and Failures

Types of Faults

- Documentation fault
  - Documentation doesn’t match what program does
  - Could lead to a series of faults
- Stress or overload faults
  - Data structures are filled past their specified capacity
- Capacity or boundary faults
  - System’s performance not acceptable when certain limits are reached
- Timing or coordination faults
  - Error in coordination of processes executing simultaneously or in a defined sequence

8.1 Software Faults and Failures

Types of Faults

- Performance faults
  - System does not perform at the speed prescribed by the requirements
- Recovery faults
  - System does not behave as the designers want after recovery
- Standard and procedure faults

8.4 Integration Testing

- Bottom-up
- Top-down
- Big-bang
- Sandwich testing
- Modified top-down
- Modified sandwich

9.3 Performance Tests
Types of Performance Tests

- Stress tests: stress to the limits
- Volume tests: large amount of data
- Configuration tests: s/w h/w configurations specified in the requirements (e.g. variety of user levels)
- Compatibility tests: when system interfaces with other systems
- Regression tests: when system is replacing another system
- Security tests: security requirements are met
- Timing tests: time to respond to a user and to perform a function

9.3 Performance Tests
Types of Performance Tests

- Environmental tests: ability to perform in the installation sites (heat, humidity, magnetic fields)
- Quality tests: evaluate the system's reliability, maintainability, and availability
- Recovery tests: address response to faults
- Maintenance tests: address the need for diagnostic tools and procedures to help in finding the source of the problems
- Documentation tests: ensure that we have written the required documentation
- Human factors (usability) tests: UI issues , ease of use requirements